

Guest Editorial

Although computers changed radically during the last decades, interaction with them remained pretty much the same. Keyboard and mouse are still the dominant devices for the interaction between humans and computers, limiting effectiveness by a lack of high-level natural human-computer interfaces. Recent technology developments have produced new opportunities for providing more advanced and efficient interfaces to the users. Some of the latest are natural gestures, touch-screens, implicit interactions and tangible user interfaces.

Engineering education could benefit from these new approaches in human-computer interaction. For this special issue, we selected original theoretical, as well as practical, papers presenting research that describes and assesses groundbreaking new devices, methods and approaches to human-computer interaction focused on applications in the field of engineering education.

The paper titled “Smart E-learning: Enhancement of Human Interaction using Head Posture Images” propose a method of interaction with eLearning system analysing head posture from the image taken from web camera, in order to establish student presence and gaze direction. Their experimental results shows that the proposed approach enhances human-computer interactions for e-learning systems and enable better evaluation of student performance.

Another one paper, titled “Seamless multi-modal interactions across computing devices for enhancing engineering education—Gesture Interaction”, presents development of innovative modalities for interaction with computers. This is one of the prime research areas in the HCI field. Users expect to abandon their keyboard and mouse and to interact more natively with computer systems. One of the promising ways for natural user interfaces is gesture interaction.

“A Hand Motion Controller Allowing for Control the Computer Models and Peripherals” paper presents a hand motion controller, which measures the orientation of the upper limb of a man in three-dimensional space. Authors present a demonstration of the controller, by controlling a virtual hand model. Their objective is to create remote laboratory kits for teaching and learning some aspects of control systems.

Next paper, titled “Enhancing Mechatronics Learning through Human Computer Interaction Technology”, presents development of remote lab interaction interface, which will enable students to perform experiments with mechatronics from distance location. Developed system should provide greater flexibility, accessibility, and ease of use for students.

During last twenty years technological development goes on the fast track. When we are talking about presentation devices, monitors, resolution and number of colours increased, aspect ratio changed. However, content that we consume remain mostly the same. Authors of the paper “Impact of screen aspect ratio on reading electronic material” examined influence of different screen characteristics (size, aspect ratio, resolution) on actual devices (desktop monitors, tablet computers and mobile phones) on reading performance. Conducted experiment shows clear advantage of tablet devices, which will be primary reading tool in the near future.

Mobile devices will be dominant platform for consuming learning materials in the near future. Paper titled “Mobile devices applied to Computer Science subjects to consume institutional functionalities trough a Personal Learning Environment” presents a case study in order to demonstrate how they can be applied as a personal learning tool in the engineering field of computer science.

We have two papers dealing with educational games. Game presents emerging form of interaction with students in the field of eLearning. First of them, titled “Design and Implementation of CoAeLearn modules for personalized game-based learning of Computer Architecture course”, presents development and evaluation of game-based learning modules in the computer architecture field, and second one, titled “Financial Engineering Education: The Case Study of Financial Modelling Using Games”, presents educational game in the financial engineering field.

The paper titled “HCI aspects of social media in collaboration of software developers” deals with actual topic of social networks and interaction problems that can arise. Authors propose a new method in order to improve user experience with collaboration tools, which should be especially useful when mobile platform is in use.

We also included three papers targeting HCI aspects of specific eLearning environments. They are “Individualizing HCI in E-learning Through Assessment Approach”, next one is “Project Based Human Computer Interaction Course: An Experiment of Online and Face to Face Learning Environment” and “Teaching Human-Computer Interaction through developing Applications in Collaboration between Academy and Autism Organizations”.

In the paper titled “White-box decision tree algorithms: A pilot study on perceived usefulness, perceived ease of use, and perceived understanding” authors evaluated usability of proposed data mining framework for white-box decision tree algorithms. As the white-box approach has been experimentally proven very useful for producing algorithms that perform better on data, in this paper it is reported how students perceive the white-box approach.

Paper “Exploring Geospatial Data Through Verbal Protocol Analysis: A Case Study at Hohai University, China” presents a case study, where authors utilized Verbal Protocol Analysis in order to collect and analyse verbal data about students cognitive processing. Major aim of presented approach is to confirm students understanding of knowledge gathered during learning process.

Finally, we wish to thank the authors who made a tremendous effort to prepare papers in a high-quality manner, and members of the Review Board on quality work and time spent which they dedicated to the review process.

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